

THE BIODIVERSITY DUTY REPORTING TEMPLATE: LEVEL ONE ORGANISATIONS

Public bodies that own or manage land, regulate land use, or have responsibilities linked to biodiversity

Report Outline

Bodies are encouraged to use the following structure for their report. This is set out in the template below, which you can either type directly into, or copy into a separate document.

- Section 1: Introductory information about your public body
- Section 2: Actions to protect and enhance biodiversity
- Section 3: Mainstreaming biodiversity
- Section 4: Nature-based solutions, climate change and biodiversity
- Section 5: Public engagement and workforce development
- Section 6: Research and monitoring
- Section 7: Biodiversity highlights and challenges

Completion Notes

These completion notes offer guidance to support your public body to complete your Biodiversity Duty Report. Taken together with the associated hyperlinks, they provide suggestions on the breadth of actions that could be included in your report. They may also assist with forward planning on how biodiversity can be taken into account in future.

While they incorporate the key elements on which you may wish to report, they are not an exhaustive list and it is likely that there will be a range of additional work that your organisation carried out in support of biodiversity on which you may also wish to report. To find out more on the Biodiversity Duty see the [NatureScot website](#).



SECTION 1: INTRODUCTORY INFORMATION ABOUT YOUR PUBLIC BODY

Please describe your organisation’s role and purpose, including any particular environmental responsibilities

<p>Text Field</p>	<p>At HES we want to use the past to make a better future. We want the historic environment to make a real difference to people’s lives: to our health, to our economy, to our culture, to our environment. We want heritage to involve everyone so that we all benefit. We are a charity and public body leading the way in protecting, understanding and sharing Scotland’s historic environment, for today and for the future.</p> <p>What we do:</p> <ul style="list-style-type: none"> • We care for more than 300 sites of national importance across the country (‘Properties in Care’, or PiCs) and are the largest operator of paid visitor attractions in Scotland. • We look after internationally significant archives and artefacts. • We are at the forefront of investigating and researching the historic environment and addressing the impacts of climate change on its future. • We protect our historic places through designations and consents, promote their sustainable development, and provide millions of pounds each year to local communities to repair and revitalise their historic environment. • We provide advice and guidance about the historic environment, and offer a wide range of training and learning opportunities. We have a statutory role in the planning process. <p>In every aspect of our work we strive to follow our five organisational values</p> <ul style="list-style-type: none"> – we are collaborative, professional, innovative, open and respectful. <p>We want the historic environment to make a real difference to people’s lives: to our health, to our economy, to our culture, to our environment. We want heritage to involve everyone so that we all benefit.</p> <p>As a Non-Departmental Public Body with charitable status, Historic Environment Scotland (HES) is overseen by a Board whose members are collectively responsible for the governance of the organisation. The Audit, Risk and Assurance Committee (ARAC) advises our Board and supports the Accountable Officer, our Chief Executive Alex Paterson, on financial stewardship and accountability, risk control and governance. The Executive Leadership Team is responsible for the day-to-day running of HES and is led by our Chief Executive. Each Director heads up one of seven directorates – Heritage; Cultural Assets; Marketing and Engagement; Finance and Corporate Services; External Relations and Partnerships; People; and Operations.</p>
--------------------------	--



There are many opportunities across our operations to support biodiversity whilst fulfilling our role as the lead public body for Scotland's historic environment.

Our Technical Resources service within Operations Directorate supports work across the PiCs, and now includes our in-house ecologist. This new post's remit ensures that HES operates within the legislative and statutory frameworks as required via our Biodiversity Duty. This includes ensuring that operational activity and future planning within our PiCs are compliant with the consents and designations of wildlife sites and appropriate consideration is always given to protected and priority species via statutory licensing and mitigation.

The Landscape Manager in the same team facilitates improvements to habitats within our Properties in Care ensuring that statutory landscape designations, landscape evaluation and enhancement of biodiversity is an integral part of how our PiC Estate is managed. This role ensures that the stipulations of landscape heritage legislation and policy (e.g., Tree Preservation Orders, Conservation Areas and Gardens & Designed Landscapes) is placed within the context of our PiC development for visitor enjoyment.

The management of PiCs has opportunities for supporting biodiversity improvement and understanding. PiCs can be special for biodiversity; many have been protected from development, particularly agricultural improvement, which has allowed the preservation of local habitats and species. Many sites therefore support populations of rare birds, bats, amphibians and many invertebrates as well as providing important wildlife corridors which allow plants and animals to migrate as part of normal activity and to spread as a result of pressure from development and climate change.

Our Scheduled Monument Consent process includes a section on wildlife to ensure proposed works do not affect European Protected Species, and to ensure that adequate mitigation is put in place. Biodiversity is also integrated into Section 17 Management Agreements (made under the Ancient Monuments and Archaeological Areas Act 1979), to further aid and integrate biodiversity within the work of our consenting responsibilities.

HES signed the joint position statement with our sister statutory body NatureScot, in 2019. This document 'People, Place and Landscape' places at the heart of a joint working approach both elements of our heritage; historic and natural and how these can be integrally linked to the benefit of both organisations' responsibilities. Coworking with NatureScot continues to grow with high-level discussions and opportunities developed.

Our Ranger Service, based at Holyrood Park, Linlithgow Peel and the Heart of Neolithic Orkney World Heritage Site, undertake site management, education and interpretation at these and other sites, and a large proportion of their work is



	related to biodiversity. We have 130 HES staff formally recognised as Green Champions, undertaking local initiatives to promote sustainability and good environmental practice across our sites.
--	--



SECTION 2: ACTIONS TO PROTECT AND ENHANCE BIODIVERSITY

Please describe and explain any actions that your organisation has undertaken alone or as part of a partnership to benefit biodiversity directly, to tackle the main drivers of biodiversity loss, or to achieve wider outcomes for nature and people

<p>Text Field</p>	<p>2021-2023 has seen some stand out examples of biodiversity protection and enhancement across our estate due to the hard work of our on-site staff and Landscape Manager. These enhancements have largely come about with the adaptation of grassland mowing regimes. Specifically, mowing has been reduced, arisings removed to reduce soil nutrients, and in some cases, areas have been reseeded or overseeded with a diverse array of species. The following paragraphs will give an overview of some of our best examples across our estate:</p> <p>Aberdour Castle Gardens:</p> <p>Aberdour is among the oldest masonry castles still standing in Scotland, with fine terraced gardens and parkland found to the east and south of the castle buildings. An orchard was originally planted below the terraces in 1690 and was replanted in the 1990s. Prior to the actions taken to enhance biodiversity at Aberdour, the lawns were cut and managed by a contractor, with most grass on-site cut short and strimmed weekly- including the orchard and woodland perimeter.</p> <p>During the 2020 COVID lockdown, little operational work was done on the site, resulting in grass being left unmown. Upon returning, site staff reported seeing more wildlife, including butterflies, hoverflies, and increased birdsong. Furthermore, it allowed staff to survey the flowering plants that had previously been suppressed by mowing.</p> <p>Areas that could benefit from a more relaxed mowing regime were carefully selected, with consideration given to cultural heritage significance, visitor experience, visitor and staff safety and community interests.</p> <p>Due to the cultural heritage significance and scheduled monument status of the PiC, large-scale turf removal or rotavation were not used, with the following process adopted:</p> <ul style="list-style-type: none"> • Scarification, raking and removal of the bigger rye grass tufts and moss; • Turning the soil with forks to aerate it, improve drainage and reduce the compaction; • Heavily sowing with yellow rattle (<i>Rhinanthus minor</i>) for the reduction in vigour of existing grasses; • Sowing mixtures of meadow wildflowers, such as knapweeds (<i>Centaurea</i> sp.), cornflowers (<i>Centaurea cyanus</i>), poppies (<i>Papaver rhoeas</i>), and plantains (<i>Plantago</i> sp.); • Planting of spring bulbs to encourage the early pollinators such as crocus (<i>Crocus</i> sp.), scillas (<i>Scilla</i> sp.) and snake’s-head fritillaries (<i>Fritillaria meleagris</i>);
--------------------------	--



- Top dressed the seeded areas with low nutrient content topsoil.

After two years, the species composition has changed significantly. The wildflower areas are cut once a season to allow the seed bank to build and reseed, with cuttings left to hay and then raked, encouraging further germination and reduction of nutrients.

Other parts of the gardens that have not been reseeded, such as areas of the historical terraces, have still seen a reduction in mowing and an improvement in biodiversity. These are instead cut three times a year, which suppresses the grass and allows smaller wildflowers like vetches (*Vicia* sp.), buttercups (*Ranunculaceae* sp.), and lady's bedstraw (*Galium verum*) to compete. The grass is checked for birds or mammals prior to cutting and the mowing itself is done in stages, allowing any wildlife within the grass to relocate.

Iona Abbey:

One of HES's most recent actions to protect and enhance biodiversity has been achieved at Iona Abbey. Iona is seen as the birthplace of Christianity in Scotland, with the abbey being founded in AD 563. Due to its remote island location, it also has the potential to be a haven for wildlife. As with many of our PICs, when ground maintenance slowed during the pandemic, returning staff saw the potential of changing mowing regimes for biodiversity.

At Iona, a new three-year mowing plan was introduced in early 2023. This has implemented three different mowing regimes across the site, with both ecological and historical reasoning underpinning which method is selected.

Around one third of the Abbey's grassland is due to be cut once a year, between mid-August and October, with clippings uplifted or baled. This will maximise flowering time, allow time for seeds to set, and reduce nutrient levels to further increase diversity. These areas allow our tall native floral species to flourish, providing a source of food for pollinators and ground cover for small mammals and birds; they will be cut from the centre outwards, to allow escape routes for small mammals, sheltering birds and insects.

Approximately one fifth of the grassland will be more frequently to maintain a 150–200mm sward height. These areas are maintained for low-growing flowering species (flowering lawn) such as clovers and bird's-foot trefoil. This regime is a balance between benefiting biodiversity, whilst still allowing the extant archaeological features to be understandable to visitors. However, it is also noted that the unmown grass moving in the wind adds to the dramatic scenery of the island, rather than detracting from its heritage.

The area directly surrounding the abbey will be shortly mown every two weeks. This frames the abbey, creates visitor paths, and allows the archaeological features to be seen.

The change in mowing regimes has already had noted benefits to biodiversity. One of the most charismatic changes, has been the recording of corncrake (*Crex crex*) calling in the summer of 2023 from within the long grass now present in the abbey grounds. The corncrake has declined dramatically across Scotland over the past century due to changing land



management practices; the longer sward now left at Iona provides cover for what can be a shy and elusive Schedule 1 listed species.

Seed-eating birds, such as goldfinches, have also benefited from the change in mowing. These charismatic and brightly coloured finches rely on seeds from the diverse grass species now found, as well as forbs such as common sorrel (*Rumex acetosa*). In July 2023, several family groups (charms) of goldfinches (*Carduelis carduelis*) were noted around the abbey, with the longer grass providing important cover in the winter.

Not only does reduced mowing benefit floral diversity, the variable sward also benefits invertebrates. As Iona is a small island that can be buffeted by inclement weather, the varying heights and density of grasses can shelter insects from rain and wind. The meadow brown butterfly which has been recorded on Iona, for example, lays its eggs on grasses, and likewise many other caterpillars' and moth's food plants are grasses. The orange tip butterfly (*Anthocharis cardamines*) is also found on Iona; the adapted mowing regimes provide early flowering lady's smock as a food source for it, and the longer grass gives cover for its overwintering stages.

White clover also provides plentiful nectar for bumblebees. These key pollinators have tongues long enough to take advantage of the nectar at the bottom of the flowers. Common lizard (*Zootoca vivipara*) was also sighted in 2023, these were spotted on the rocks and taking advantage of the plentiful long grass cover.

As thousands of people visit Iona Abbey annually, this increase in charismatic species further engages the public with wildlife. The changes also represent how to successfully balance showcasing history and biodiversity at the same site.

The work at Iona has been positively recognised by our neighbours on the island, the National Trust for Scotland and [NatureScot](#) and will be featured in NatureScot's annual report.

Dryburgh Abbey:

Whilst it was an active medieval monastery, Dryburgh Abbey was never as wealthy or influential as the abbeys at Kelso, Jedburgh and Melrose. However, located in secluded woodland by the River Tweed, Dryburgh is now a place where visitors can feel close to biodiversity, akin to the monks who were famous for working with nature.

The biodiversity of the site has been enhanced and protected significantly in recent years. This began in 2017 with the reduction in mowing in certain areas; however this has been expanded and recognised significantly in the 2021-23 period.

A recent change is the vegetation within the internal cloisters area. This has been left long during summer to allow species that had been suppressed to flourish, without introducing new seed. This means that flowering plants that were there historically are now showcased to visitors, with species such as yarrow (*Achillea millefolium*) and common spotted orchid (*Dactylorhiza fuchsii*) able to flower within the lawn. The vegetation has been cut to replicate the shape of the traditional vegetable garden that was kept by the monks; this means that these changes not only enhance biodiversity, but have also



enhanced visitor experience at the site. At the end of the season the area has been cut with arisings lifted to ensure that seed is set and the nutrient levels within the sward are not increased to the detriment of the flowering species.

The team at Dryburgh are also engaging with a local school to run a competition for the pupils to design a garden shape for the cloisters, that will then be integrated into the grass mowing. The pupils will then be encouraged to return throughout the season to observe the changes in the plant and animal life right up until its final cut of the year.

The cutting height in an area of the nave has also been raised to allow for a basic flowering lawn; this extra height helps prevent erosion from visitor foot traffic, but even this small change has allowed an abundance of clover and other species to flourish in the area.

Our changes at Dryburgh have received significant positive media attention, as highlighted in [Section 5](#) of this report.

Holyrood Park

The Ranger Service at Holyrood Park completes many practical actions throughout the year to enhance and protect its biodiversity, including through volunteer engagement. This includes cutting fire breaks within the areas of the park dominated by gorse (*Ulex europaeus*), thereby allowing other species to grow in the breaks. Common rock-rose (*Helianthemum nummularium*), which is one such species that this benefits, is the food of the northern brown argus (*Aricia artaxerxes*) butterfly caterpillar (a UK Biodiversity Action Plan priority species).

The Ranger team also work hard to reduce the impact of invasive non-native species within the park. Himalayan balsam (*Impatiens glandulifera*), for example, used to dominate areas of the park and crowd native species to the detriment of biodiversity. Due to the diligence of the Ranger team, however, Himalayan balsam is now no longer a major issue in the park with only a few small plants found each year.

In 2022, 62 conservation tasks were undertaken, with 188 hours spent from both Ranger Service staff and volunteers.

In 2023, 24 conservation tasks have been undertaken (fewer due to there no longer being any need to manage Himalayan balsam), with 49 hours spent so far.

Toad Patrols and Ladders

The Rangers have also assisted with 'Toad Patrol' programme at Holyrood Park annually. Through this they carry out daily morning patrols on the High Road at Dunsapie Loch during the toad migration period (March-April). Any common toads (*Bufo bufo*) that are found to be stranded on the road, are collected and helped into Dunsapie Loch to complete their breeding cycle. This is in collaboration with Lothian Amphibian and Reptile Group (LARG) who carry out patrols at night. Data on the numbers of toads collected is recorded and fed back to LARG.



We have also installed 33 toad ladders in drains along the High Road. This enables the escape of migrating toads which have fallen into the drains when crossing the road, as well as other amphibian species present in the Park such as smooth newts (*Lissotriton vulgaris*), palmate newts (*Lissotriton helveticus*) and common frogs (*Rana temporaria*).

Ground Nesting Birds

Skylarks (*Alauda arvensis*) and Meadow pipits (*Anthus pratensis*) have been a charismatic feature of Holyrood Park during the summer months historically, singing above Salisbury Crags during the breeding season. However, they have declined in recent years to just a few pairs each. To protect these declining populations, the Ranger Service have established a 'dogs on lead' policy for important nesting areas. This means that dog walkers in these areas between April and August are asked to keep their dogs under control on a short lead, with informative signage. This is backed up by the Rangers engaging with visitors when out on patrol.

Jubilee Wood

In July 2022, as a Platinum Jubilee gift from Scotland to Her Majesty Queen Elizabeth II, First Minister Nicola Sturgeon MSP announced that a 'Jubilee Wood' would be planted in Holyrood Park. This comprised 70 trees made up of native species - one for every year of Her Majesty's reign.

During the following winter, we welcomed HRH The Princess Royal to Holyrood Park to plant the final oak tree (*Quercus sp.*) in Jubilee Wood, which is situated in the east end of the park, opposite St Margaret's Loch – one of the most popular spots for walkers. She was welcomed to the site by Ms. Sturgeon; His Majesty's Lord Lieutenant; Lord Provost of Edinburgh Rt Hon Robert Aldridge, and senior HES staff Craig Mearns and David Storrar, who introduced HRH to the HES and Scottish Government project delivery teams. In Autumn 2023, woodland flowers were planted throughout the Wood by Junior Rangers and local schoolchildren.

Linlithgow Peel and Loch

Linlithgow Loch has experienced large-scale blooms of cyanobacteria, which have detrimental effects on water quality and biodiversity that relies on the loch. A report compiled by Scottish Agricultural College highlighted the surrounding catchment area as 'high risk' for excessive nutrient sources. To better understand the source of the eutrophication in the loch, HES commissioned a Nutrient Load and Source Apportionment study from the UK Centre for Ecology and Hydrology (UKCEH). This source apportionment work undertaken by UKCEH with fieldwork assisted by SEPA and HES Ranger Service, commenced in summer of 2019 and has been completed with their recommendations submitted in November 2021.

As a result of the publication of the UKCEH report HES has reconvened the Strategic Loch Management Group to discuss and formulate management plans, following the recommendations of UKCEH. To coincide with the source apportionment



study, a survey of the aquatic vegetation of Linlithgow Loch was commissioned by HES. This was published in 2022 and, along with the UKCEH report, will be used to inform future management plans.

In 2023 a wildflower area comprised of native species was planted at Linlithgow Peel. This was done with the assistance of the Rotary Club of Linlithgow Grange.

The Junior Rangers group, made up of local young people, also planted some native bulbs in the woodland around the Peel in Autumn 2023.

In December 2022, a 60-metre length of hedgerow was planted by local volunteer group Burgh Beautiful and the Ranger Service. A mix of native trees was used.

Ongoing research and investigations in conjunction with stakeholders is considering ways in which water quality of the SSSI can be improved.

Natural Capital:

HES continues to explore the value of natural capital across its estate. In 2022, high level natural capital assessments were completed for 22 PICs. These gave a high-level assessment of carbon storage and sequestration, soil erosion prevention, flood risk prevention, recreational value and important areas for supporting insect pollinators of crops and other important biodiversity habitats.

HES staff members have also joined the NatureScot-led 'Natural Capital on Public Land' working group to stay up-to-date with developments and ensure that natural capital is recognised within HES.

Grampian and Shetland

In Grampian and Shetland there have been new grass cutting contracts issued that all include less grass cutting and more left long for wildlife benefits. This was again prompted by the COVID lockdown providing a vision of what some of our PiCs could be like with a less strict grass management regime.

There have also been wildflower seeding trials that have been begun in the last 3 years, in particular at a now established meadow area of Spynie Palace. This includes such species as red campion (*Silene dioica*), yellow rattle (*Rhinanthus minor*), and harebell (*Campanula rotundifolia*).



SECTION 3: MAINSTREAMING BIODIVERSITY

Please outline any steps your organisation has taken to incorporate measures to protect biodiversity into its wider policies, plans or strategies. This should include decision-making structures and staff and organisational roles and responsibilities.

Text Field	<p>Mainstreaming Biodiversity through Organisational Roles</p> <p>Our activity supporting biodiversity is spread across the organisation and no one director currently has oversight of this area. However, we have new posts that help to protect and enhance biodiversity at HES.</p> <p>A significant development has been the creation of and recruitment for the new role of Environment Advisor (Ecologist) within the Operations Directorate. This is an important role that shows HES's commitment to mainstreaming and considering biodiversity within its operational decisions. This role aims to develop strong working relationships with onsite staff, as well as across all departments and leads on embedding biodiversity and ecological management into business-as-usual activities and capital works planning of new developments, such as Monument Investment Plans. This has been of particular importance due to the onset of HES's High Level Masonry Programme. The role ensures that statutory obligations for protecting and enhancing wildlife and habitats occurs during inspection, maintenance and conservation are met. The Environment Advisor will also undertake a rolling programme of ecological and biodiversity assessments for our PiCs and will aim to integrate natural significance into their Statements of Significance.</p> <p>Newly created in 2022 is the fixed-term Biodiversity and Climate Change Coordinator Post within the Climate Change Policy Team, based in the Cultural Assets Directorate. This post supports delivery of the Biodiversity and Landscape Actions identified within the HES Climate Action Plan and the preparation of the HES Biodiversity Report.</p> <p>In late 2023, a Sustainable Procurement Coordinator was appointed. This post sits within the Procurement Team, but with a close working relationship with the Climate Change Team. The post-holder will aim to make progress in all areas of sustainable procurement, including ensuring that biodiversity is considered within HES's purchasing.</p> <p>Our Green Champions network has continued to thrive in recent years. This will be discussed in further detail in the Workforce Development section of this document. However, in terms of mainstreaming biodiversity it is important to note that the target is to have 10% of our staff designated as Green Champions, working across the different directorates and regions.</p>
-------------------	--



Mainstreaming Biodiversity within Interpretation

Considering biodiversity stories, both contemporary and historic, is now a requirement within the Content Planning section of the HES Interpretation Process document. This is an internal document that the interpretation team follow when planning their engagement work. In practice, this means that staff should consider whether there is an opportunity to include biodiversity messaging and stories in any new content, such as onsite interpretive exhibitions, guidebooks, graphic panels and digital media:

“As part of our planning process, we proactively consider opportunities for integrating climate change messages into our interpretive content. For example:

1. The tangible impact of climate change on a site
2. How changes in the local and global environment have affected the structures and people at our sites over long periods
3. The work HES does to mitigate the effects
4. Local biodiversity stories – both contemporary and historic”

Mainstreaming Biodiversity within the Heritage Directorate

[Our Regulatory Framework](#) (published 16 May 2023)

We have recently developed a new [framework](#) which identifies and describes the work we do in designation, building survey, environmental assessment, the planning system, World Heritage, dangerous buildings, and the management of scheduled monuments. It is a high-level overview, with links to the laws and policies that guide how we deliver these services. The framework also describes the principles and goals that underpin our work and how we are responding to challenges facing Scotland, including the climate emergency and ecological crisis. When developing the framework we explored how, through our various roles, we can play our part in helping to restore biodiversity, resulting in an objective on biodiversity being added. This will help to further mainstream Scotland’s aspirations for biodiversity at a strategic level in our operational planning and through the services we provide.

[Pointing the Way to the Future](#) (published 21 July 2023)

Building on Our Regulatory Framework, we subsequently published a position statement on how we will approach our regulatory and advisory services in the planning and other consenting systems in the context of the climate and nature crises. This statement, called [Pointing The Way to the Future](#), explains how we undertake these regulatory functions in a way that responds to our wider environmental responsibilities. The statement is an important first step that will start a



wider conversation about how our regulatory work can contribute to climate adaptation and mitigation. It sets out current practice and a small number of high-level actions.

We regularly receive consultations on plans, programmes and strategies which address biodiversity issues. Where appropriate, our responses advocate for a holistic environmental approach, which seek to optimise mutual (and often interdependent) benefits for the natural and historic elements of the environment. We highlight the connections between the historic environment and biodiversity, and discuss ways in which the historic environment can, and does, support and enhance biodiversity.

Some examples over the past 3 years include our engagement with the Scottish Biodiversity Strategy, the new Agriculture Bill, Loch Lomond and Trossachs National Park Partnership Plan, the Draft Strategy for Environment, Natural Resources and Agriculture Research 2022-2027 and emerging local development plans. We have also published a range of articles on the relationship between the management of heritage and nature, particularly in the context of [agricultural reform](#).

Case study: Peatland restoration and planning guidance

Peatland restoration is high on the international agenda, and across the UK extensive targets for restoration are being set by all governments (national and devolved), exceeding 320,000ha by 2030. Overall, this development is positive as restoration can safeguard and enhance biodiversity, ecosystem service provision, and carbon storage/sequestration.

Restoration has been brought to prominence by increasing understanding of the quantity of carbon held in global peatlands, how the degraded nature of global peatlands puts carbon stocks at risk, the cost-effective opportunities that restoration provides for reducing CO2 emissions from decaying vegetal matter, and the potential to return global peatlands to active carbon sinks.

However, ambitious restoration targets, and restoration techniques that range from low impact (seeding eroded surfaces) to highly invasive (sub-surface bunding), can pose risks to peatland cultural heritage. Archaeological and palaeoecological records, historic cultural associations, place names and folklore are intrinsically bound into peatland landscapes.

Human activity over thousands of years has left indelible marks. Prehistoric and historic drainage and peat-cutting began the long-term degradation of ecosystems, leading to the need for modern intervention. Despite this, peatland cultural heritage can be rich and well-preserved, the anaerobic nature of histosols preserving organic archaeological material absent from other ecosystems. Damage to this record, either through ongoing degradation or directly through unmitigated restoration procedures, could result in the loss of these important remains.

During 2022 we worked closely with partners to develop mitigation strategies for both managing this risk and highlighting the opportunities that could stem from restoration. This includes helping to put in place a system of archaeological oversight and mitigation to reduce operational risk for restoration projects. In turn, this reduces the chance of interacting with archaeological sites unnecessarily.



We have also looked at ways for restoration activities to help identify new discoveries. A recent example was the discovery of an undocumented stone row and two rock art panels discovered by [Peatland ACTION](#) and subsequently considered for designation.

The Scottish Government have set a target of restoring 250,000ha of degraded peatlands by 2030, with a £250,000,000 price tag. This work, undertaken by Peatland ACTION, is now being supported by HES with technical advice and training. Our aim is to smooth the way for restoration by upskilling the sector, while providing a robust level of screening provision under Permitted Development Rights (PDR) which were recently reformed to make it easier to take this important work forward.

In support of this, we have worked with the [Association of Local Government Archaeological Officers](#) (ALGAO): Scotland who have led the production of [new planning guidance](#) on how to best identify and mitigate risks to historic assets and places when scoping projects and undertaking works. The process of developing this guidance and the resulting publication has been incredibly helpful for identifying and putting measures in place to best support peatland restoration across Scotland.

“We welcome the publication in Scotland of ALGAO’s Peatland Restoration and the Historic Environment Guidance. This landmark guidance is the product of collaborate partnership working bringing together Local Authorities and leading partners from across both the natural and historic environment sectors to ensure best practice in preserving our nationally important peatlands in the face of the challenges presented by Climate Change. We hope that this can be an example for the development of best practice and collaboration across the UK.”

John Lawson, ALGAO: UK Chair

Mainstreaming Biodiversity through Internal Systems and Groups

There have been changes to mainstream biodiversity into our internal systems; specifically, to the PiC Asset Management System (PICAMS). This is a digital asset management system for the HES Estate with digital workflows to support PiC asset management. One established feature is the ability to view cultural heritage designations that overlap with our properties, such as Conservation Areas or Scheduled Monuments. However, previously there was no facility that allowed staff an easy way to check natural heritage designations. Although still in the testing phase, this has begun to change, and users can now see specific natural heritage designations that overlap our properties. At present, Sites of Special Scientific Interest, Special Areas of Conservation and Special Protection Areas are shown on a web-map, and users are linked to the NatureScot SiteLink database to show the features and Operations Requiring Consent related to the designation. This will allow site managers to easily check natural designations at their sites and stay in line with regulation.



Following a Covid-related hiatus, the internal Landscape Working Group at HES has been revived on a more formal footing. This working group allows staff from across the organisation to discuss and network on all issues related to biodiversity and landscape. This is explained within the group's Terms of Reference:

There is an increasing focus on biodiversity and landscape issues within Historic Environment Scotland (HES). For example, the Climate Action Plan 2020-2025 has a theme and consequent actions dedicated to biodiversity and landscape. Because of this, there is a need for a forum for staff members to share and discuss their related work and issues. The Landscape Working Group will act as this forum to allow collaboration between staff and further HES's biodiversity and landscape aims.

The definitions for biodiversity and landscape adopted by the Scottish Government will be used within the working group. Namely, these are:

Biodiversity: "all of life: animals, plants, fungi and microorganisms and their interactions with their environment. Together, these form living systems, called ecosystems, which sustain nature and upon which our own survival depends."

Landscape: "an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors."

The specific goal of the group is to enhance HES's work on biodiversity and landscape, however there are no specific outputs for the group to develop.



SECTION 4: NATURE-BASED SOLUTIONS, CLIMATE CHANGE AND BIODIVERSITY

How has your organisation integrated biodiversity into actions on the climate emergency such as through Nature based Solutions?

<p>Text Field</p>	<p>Supporting Traditional Thatching as a Nature-Based Solution</p> <p>It is estimated that fewer than 250 thatched buildings survive across Scotland. HES supports the repair of heritage thatched roofs through its grants programme and has a duty to ensure that our funding does not support activity that could harm the environment. We have been delivering a programme of research since 2022 that explores a range of factors connected to the supply of thatching materials, including sustainability, environmental impacts and the impacts of climate change on those materials. We have also been providing support to ensure that the important wildlife habitat on the Tay Estuary, managed by the RSPB, can continue to provide a sustainable and nature-positive supply of indigenous, low carbon reed for Scottish thatched roofs.</p> <p><i>Exploring thatching materials in the Western Isles</i></p> <p>In 2021, HES commissioned SAC Consulting to conduct an audit of thatching materials in the Western Isles. This research was carried out in consultation with local communities, crofters, landowners, thatchers and grazing committees. Part of this research explored the existing and potential environmental impacts, benefits, and disadvantages of harvesting thatching materials on the islands (marram grass (<i>Ammophila arenaria</i>), heather (<i>Calluna vulgaris</i>), rush (<i>Juncus sp.</i>) and indigenous cereal crops such as bere barley (<i>Hordeum vulgare subsp. hexastichum</i>)) in order to inform future HES research. A programme of research focused on marram grass was subsequently commissioned; see below.</p> <p><i>Reed harvesting - supporting biodiversity on the Tay estuary, Perthshire</i></p> <p>Around 40% of our surviving thatched buildings in Scotland are roofed with reed. The only commercial source of thatching reed in Scotland today is the Tay Reedbeds in Perthshire, managed by the RSPB. As well as providing an essential thatching material, reed cutting also plays an important role in creating a variety of habitat conditions to support a wide range of biodiversity on the reedbeds. HES have been providing financial assistance to the RSPB since 2020 to harvest reed for thatching and support this important and rich wildlife habitat. The reed beds were originally established to protect the riverbank from erosion, and today they're home to a rich array of wildlife. They're part of the Inner Tay Site of Special Scientific Interest (SSSI), because of its habitats and bird life, including the bearded tit (<i>Panurus biarmicus</i>)—a species which lives in reedbeds and relies on them year-round. The reedbeds are also a stronghold for the Scottish population of breeding marsh harrier and hold a large number of the elusive water rail.</p>
--------------------------	--



Researching sustainable ways to harvest marram grass for thatch in the Western Isles

There are only around 43 properties remaining in Scotland thatched with marram grass. These distinctive roofs would once have been common across the Western Isles but are becoming increasingly rare; these rare survivors are therefore more important than ever to repair and maintain. Marram grass grows on coastal sand dunes and is mostly harvested in the Western Isles. The harvesting of marram has become a contentious issue in recent decades due to fears that this could accelerate coastal erosion as material is removed. HES has been funding scientific research and data gathering in collaboration with NatureScot since 2022 to establish how marram can be harvested in a sustainable way that protects local ecosystems and coastlines. This research includes ground-based and aerial coastal mapping which will provide additional benefits for work linked to Scottish Government's Dynamic Coast project. Site trials to test different harvesting methods are due to begin in 2024. Research, survey and site trials will be used to inform new guidance on harvesting marram which will be produced in the coming years in partnership with NatureScot.

Our Properties in Care as Nature-Based Solutions

HES also recognises that in some cases its properties can act as nature-based solution themselves. This is particularly evident in our sites that have green spaces. For example, they can sequester carbon, slow down surface water run-off, and alleviate urban heat islands. There has been recent tree planting at some of our PiCs where appropriate, for example at Spynie Palace we have replanted about 120 new oak trees and other natives to replace elm trees that had to be removed.

Furthermore, our green sites can act as a nature-based solution to both physical and mental health, where they provide visitors a space to feel connected with nature through the wildlife living there, overlook picturesque views, and at some PiCs provide recreation and exercise space. Holyrood Park is a prime example of this, where HES' conservation and management of the site means that its preserved landscape and biodiversity provide many nature-based solutions to the city.

[Holyrood Park's Outline Strategic Plan](#) highlights its value in offering nature-based solutions:

Inevitably our rapidly changing climate will affect the Park, with periods of extreme drought, flooding, heat and cold occurring more frequently over the coming decades, alongside steadily rising temperatures. This will change the landscape, vegetation and habitats of the Park; as well as affecting user patterns and requirements. It will also impact on the archaeology of the Park: increased waterlogging, erosion and drought can have significant impact on archaeological remains.

There is a clear obligation and responsibility for the Park to contribute to Edinburgh's wider need for climate action and resilience. The Park has much to offer in terms of improving surface water management, ameliorating



	<p>urban heat island effects and delivering nature-based solutions, and these have to form a fundamental component of the future direction of the Park if Scotland’s declared climate emergency is to be addressed.</p> <p>...</p> <p>Holyrood Park is a fundamental component of this wider green infrastructure network and, outside of the Pentland Hills Regional Park, is the largest single accessible greenspace in the City. The Thriving Greenspaces strategy clearly articulates the value of the green infrastructure in Edinburgh setting out that a “Natural Capital Account” by Vivid Economics estimated that Edinburgh Council’s parks and greenspaces generate benefits of £174m per year, with mental wellbeing and physical health benefits being estimated at c. £22 per visit (combined); with further amenity and carbon benefits on top of that.</p> <p>This assessment predates the COVID-19 pandemic which highlighted the value that people place on greenspaces for their own health, wellbeing and quality of life.</p> <p>The Landscape Manager coordinated an integrated Landscape Conservation Management Plan during 2023, which has included significant survey of the landscape, biodiversity and archaeological features of the site. This work has been conducted by external consultants and will be reviewed by NatureScot to ensure that current management and strategic development of the site will retain its geological and ecological condition as a Site of Special Scientific Interest (SSSI). This important document will help underpin the ongoing work and public consultation on the Outline Strategic Plan.</p>
--	--

Looking ahead, what do you think will be the main climate change related challenges for biodiversity over the next three years?

<p>Text Field</p>	<p>Extreme weather events are a growing threat at many of our sites, with warmer summers being particularly evident. Not only does this threaten the structures of our built heritage, but also the biodiversity at our sites. For example, this has caused notable changes within Holyrood Park; the pond within Hunter’s Bog has dried up each summer of 2021-23, whilst previously being a scarce event.</p> <p>We may also see an increase in invasive species at our properties as their ranges expand and adapt to the changing climate. For example, the harlequin ladybird (<i>Harmonia axyridis</i>) and the Asian hornet (<i>Vespa velutina</i>), are invasive species that are an emerging threat to the wildlife at our sites and must be monitored. The risk of wildfires at our sites is also likely to increase with hotter, drier summers. This poses not only a threat to biodiversity, but also to the historic environment, through degraded soils and accelerated erosion posing a risk to underlying archaeological remains.</p>
--------------------------	---



SECTION 5: PUBLIC ENGAGEMENT AND WORKFORCE DEVELOPMENT

Public Engagement

Text Field	<p>As a public facing organisation, engagement continues to be at the centre of Historic Environment Scotland’s work. However, in recent years we have ensured that we engage the public on not just the human history of our sites, but also their natural history and current biodiversity.</p> <p>Biodiversity Engagement at our Properties in Care</p> <p>Biodiversity stories are regularly integrated in new HES onsite interpretation and activities. These could be told through a double-page spread in a guidebook, a stop on an audio-guide, or section of a graphic panel. The approach is to try and ensure that these stories form part of the overall site narratives, rather than only told through separate dislocated pieces of interpretive media. Recent examples include multiple pages within the Holyrood Park Official Souvenir Guide, stops in the Linlithgow Palace and Peel and the Holyrood Park mobile audio-guides, new interpretation panels for Holyrood Park, or wildlife show-and-tell activity integrated into visitor events such as Linlithgow Jousting and Blackness Castle Siege on the Forth.</p> <p>Signage at HES sites proactively highlights operational changes to improve biodiversity. For example, when we make changes to our estate to enhance biodiversity, such as the changes to grass cutting described in Section 2 of this report, we accompany this with signage explaining why these changes have been made. This is important as it leads the public to understand the justification on why the grass may look unkempt at important heritage sites such as Dryburgh Abbey, Iona Abbey, and Doune Castle.</p> <p>Several of our sites have family Wildlife Spotter guides – a new one was developed for Skara Brae in 2023 to support the Orkney Nature Festival. These guide the public along a nature trail and showcase species that may be seen along it, for example encouraging visitors to look out for otters, herons, and red campion at Doune Castle.</p> <p>There has also been family engagement on biodiversity at Inchcolm Abbey. Funded through a bequest from a Historic Scotland member who had visited and enjoyed the abbey, the Learning team created a self-led learning resource for young visitors to the island in 2022. With a brief to develop an activity pack that highlighted the island’s biodiversity, the team bought backpacks, binoculars, fishing nets, bug catchers and magnifying glasses for learners to borrow while visiting the island. These were complemented by an activity sheet that challenged young visitors to find and identify flora and fauna on the island, as well as learning about its past as a religious and military centre. By completing the activity, visitors can receive a sticker that dubs them “Inchcolm Explorers”, The bequest paid for the initial capital outlay and continues to pay for replacement equipment and replenishment of worksheets and stickers. A similar project has been</p>
-------------------	--



rolled out at Blackness Castle, encouraging visitors to use binoculars and field guides to spot wildlife within the Firth of Forth.

Biodiversity Public Engagement at Holyrood Park

HES Ranger Service regularly engages with members of the public, in both an informal capacity while on site at Holyrood Park and Linlithgow Peel, but also through a structured plan of public engagement events. These include general guided walks at our sites, hosting stalls at major events for drop-in sessions, and more focused guided walks and activities with specific themes.

As well as running events that are open to the public, the Ranger Service also engages with community groups upon request. Groups include Alzheimer's Scotland, Venture Scouts, UPMO, Global Citizen and SPACE.

The protection and promotion of wildlife and biodiversity are values that lie at the heart of any ranger service, and HES Ranger Service strives to educate the public about these important topics whenever possible. Biodiversity is mentioned on all of our routine guided walks (along with other site-relevant topics such as geology, archaeology and history), while some of our guided walks and events are specifically focused on biodiversity and wildlife.

Therefore, the avenues by which the Ranger Service engages with the public about biodiversity can be categorised in 4 groups:

1. General Guided Walks (Arthur's Secrets, Arthur's Amble etc.)
2. Biodiversity/Wildlife Specific Guided Walks (Dawn Chorus, Wildflower Wander etc.)
3. Community Group engagement
4. Ranger presence/stalls at larger events (Linlithgow Jousting), public engagement sessions

2023

1. General Guided Walks – a total of 53 delivered (as of 29/11/2023) to a total of 478 visitors
2. Biodiversity specific guided walks and events -17 events engaging with a total of 254 visitors. These were held at a number of HES properties (Holyrood Park, Linlithgow Peel, Blackness Castle, Croy Hill and Seabegs Wood). These included Dawn Chorus walk, Wildflower Wander, Blackness Birding, Go Bats! And Linlithgow Water Safari. The fungi walks at Seabegs Wood are a new event and have been well received. We also co-hosted a public drop-in event on National Fungi Day with the Edinburgh and Lothians Fungi Enthusiasts group which was very well attended.



3. Community Groups (when delivered with biodiversity as a central topic) – total of 54 sessions to 717 visitors. Activities include gorse cutting, litter clearance, making bird feeders.

4. Ranger presence/engagement stalls. 9 sessions delivered to a total of 2082 visitors. This included ranger presence at major HES events such as Linlithgow Jousting event and Blackness Castle’s ‘Siege on the Forth.’

2022

1. General Guided Walks – 83, to a total of 570 visitors
2. Biodiversity specific walks and events – 7, to a total of 137 visitors
3. Community groups (biodiversity specific) – 15, to a total of 228 visitors
4. Ranger presence/engagement stalls – 3, to a total of 1082 visitors

2021 (lower numbers due to coming out of lockdown restrictions)

1. General Guided Walks – 14, to a total of 118 visitors
2. Biodiversity specific walks and events – 3, to 16 visitors
3. Community groups – 3, to a total of 29 visitors
4. Ranger presence/engagement stalls – none

Biodiversity Education Engagement at Holyrood Park

Holyrood Park also has a dedicated Education Ranger to support visits from educational establishments and family groups.

Groups can be involved in a range of activities that engage and educate young people on biodiversity. These include:

- Habitat management- groups can assist with managing habitats within the park. For example, gorse cutting is one of the most popular activity with school groups. Not only does this promote biodiversity in the park by reducing the dominance of gorse, it also gives young people the chance to use hand tools such as saws and loppers.



- Bird watching- at St Margaret's Loch, groups can learn how to identify different birds and what birds can and can't eat. This encourages responsible interactions with wildlife and promotes their conservation of their habitats. There can also be a fun, practical element where groups make simple bird feeders to take home.
- 'Orientreeing'- this activity combines learning basic map reading and navigational skills with tree ID. Groups go on a tree 'scavenger hunt' around the park, which is educational, engaging and fun.
- Minibeast hunts- groups search for invertebrates, how to identify them, and learning their interesting adaptations to their environment.
- Food chain game- this game teaches groups about food chains and what happens to an ecosystem when it is under threat, for example from habitat loss.
- Litter picks- as well as preventing wildlife from being harmed by litter, this activity can make groups feel invested in their local area by helping to improve its cleanliness

The engagement numbers below show that the Ranger Service at Holyrood Park engages with large number of young people via school and community visits:

Number of children engaged with in school visits:

21/22 financial year: 215 (not full amount – incomplete data)

22/23 financial year: 936

23/24 financial year: 1177 (so far)

Number of children engaged with in community visits:

21/22 financial year: 17

22/23 financial year: 55

23/24 financial year: 20 (so far)

Biodiversity Engagement from the Orkney Ranger Service

The Ranger Service at the Heart of Neolithic Orkney World Heritage Site educate visitors of all ages at significant sites in our care, such as Ring of Brodgar and the Stones of Stenness.



Public engagement on biodiversity is included in almost every public engagement opportunity, including guided tours, school sessions, or simply engaging with drop in visitors on site. Visitors are engaged with the biodiversity of past and present that both within the site and part of the wider Orkney landscape- such as the RSPB Brodgar reserve and the SSSI of Harray and Stenness Lochs, with Stenness also being an SAC. In the summer months, additional weekly wildflower and folk belief walks are given to highlight the wildflowers in bloom at the sites.

The Ranger Service also collaborate with colleagues from partner organisations, specifically from Species on the Edge project- a partnership project between NatureScot and seven nature conservation charities. This is to highlight and reverse the decline of 37 threatened species found in Scotland, some which can be seen at Brodgar due to the careful management of the wildflower meadow and the work of the RSPB on their reserve.

Ranger Service staff also sit on the steering group for the Orkney Nature Festival and incorporate additional public events when it takes place in May of each year.

In total the Ring of Brodgar receives around 125,000 visitors a year and Stenness Standing Stones around 80,000. The Ranger Service delivers approximately 300 guided walks a year, with around 4500 people attending. They also engage with 25 school classes a year, totally over 300 pupils.

Biodiversity Engagement Events and Exhibitions

Recently, HES have hosted events that tell stories of biodiversity at some of our sites. In 2023 we worked with RSPB Scotland on touring their Operation Broken Feather exhibition to Maeshowe Chambered Cairn, Fort George and Stirling Castle. This was a family friendly exhibition that promoted the plight of the declining Corncrake (*Crex crex*) and at Maeshowe this included an engagement session with a local primary school.

Stewards at Stirling Castle also put together a wildlife tour given during Climate Week in September 2023. This highlighted the wildlife in the castle grounds and surrounding area both from the past and present. The event engaged with both adults and children and acts as a great example of our onsite staff championing biodiversity.

Additionally, HES and Arts&Heritage commissioned an arts performance entitled 'The Bird That Never Flew'. The performance at Glasgow Cathedral in September 2023 explored the ancient Cathedral's roots in ornithological entanglements, bringing together sacred lament and ecological political protest to raise the alarm for critically endangered birds and the impacts of climate change.



Access for Learning

As part of our commitment to providing inclusive access to the historic environment for learning groups, HES operates two access schemes.

Free Learning Visits provides free access to HES Properties in Care for qualifying learning groups. As well as being able to explore the built heritage, this gives learning groups access to outdoor learning at our sites. This means learners can engage with the green spaces, habitats and wildlife found within our estate.

Similarly, the Heritage Travel Subsidy is a scheme that provides grants for Scottish schools to help with travel costs when visiting heritage sites. Travel is still the largest barrier to access our sites for schools, but this subsidy means school groups can engage with environments and wildlife that they may not otherwise experience, particularly the case with inner city schools.

The Hive Project

The Hive Project has been running since 2017 and introduced beehives to Stirling Castle- two hives are situated in the Nether Bailey area behind the Tapestry Studio each with a colony of around 60,000 bees. The hives are managed by our contractor and collaborator Good Bee Projects Ltd and pupils from Stirling High School – pupils range from S1-S6 and now gain a recognised SQA qualification at National 5 (NPA in Beekeeping award)

Hive awareness sessions run annually for site staff and honey is sold at the castle Christmas Fair, with pupils taking part in both events. In the future, there are plans to produce a story resource aimed at early years children about life in the castle through the eyes of a bee which underlines the importance of bees and pollinators within the ecosystem.

Whilst there is on-going research in scientific literature on the potential detrimental effects of large-scale commercial honey production to local pollinators, the Hive Project at Stirling Castle is small scale and serves to engage the public. In particular, it engages local school pupils with invertebrates and supports a heritage skill while demonstrating local food production.

Biodiversity Communications



Historic Environment Scotland's recent work to protect and enhance biodiversity on our estate has led to several features in the media and blog posts in collaboration with partner organisations.

Specifically, our work to enhance the wildflower meadows at Dryburgh Abbey were recognised on the [BBC News](#) website and a local news crew filmed a short piece on the works.

There have also been two blog posts in collaboration with NatureScot's Scottish Pollinators Blog- these were again on [Dryburgh Abbey](#), but also featured the recent mowing regime changes at [Iona Abbey](#).

As noted below, an elm at one of our PiCs, Beaulieu Priory, has also received media attention in recent years.

Beaulieu Priory Elm

A wych elm (*Ulmus glabra*) tree had stood at the gateway to Beaulieu Priory for over 800 years: when the priory was founded in 1230, the elm was recorded on the deeds.

Unfortunately, as Dutch elm disease spread further northwards into the Highlands, the tree was infected in its later years. As a result, it last produced buds in 2021 with a survey showing only 5% of the tree was still living.

In 2022, HES funded a [Guardian of the Gateway](#) from the Year of Stories 2022 Community Stories Fund. This was a project by the artist Isabel McLeish and gallery Circus Artspace, with the aim to:

encourage dialogue about the implications of climate change, disease spread and ecological loss in the Highlands as well as celebrate our relationships with an ancient native Scottish tree.

It involved a series of engagement events in front of the elm, including stories, food and art. Speakers included community members, writers, and tree experts- being attended by almost 100 people and receiving [press attention](#)

An 80-page publication was also produced which includes pieces from environmental writer Mandy Haggith, partners from NatureScot and the Royal Botanic Garden Edinburgh, as well as Beaulieu Primary School and the community.



	<p>Unfortunately, the tree fell down in January 2023 after a series of swings between freezing and thawing temperatures caused it to be uprooted. Therefore, the elm’s later years was likely influenced by climate change, firstly with Dutch elm disease and consequently from weather events that led to it falling.</p> <p>However, the Digital Documentation team scanned and produced a 3D digital model of the tree in 2021, preserving its shape and presence in some way for future generations.</p>
--	---

Workforce development

<p>Text Field</p>	<p>Our Green Champions network is a resource that often provides staff with opportunities for professional development and the enhancement of biodiversity at their workplace. The network comprises 130 members from different parts of the organisation, with the aim to maintain 10% of the workforce as members. This year the annual Green Champions’ Conference had an afternoon session focused on biodiversity. This gave staff the opportunity to present the biodiversity improvements they helped achieve at their site, and for others to ask questions on how they might achieve similar actions at their site.</p> <p>Within the Holyrood Park Ranger Service, Rangers are also regularly trained on specific species groups by experts. For example, the Botanical Society of Britain and Ireland ran a wildflower identification course for the Ranger team and volunteers in August 2023.</p> <p>Our Environment Advisor (Ecologist), has also given toolbox talks on protected species for 34 on-site staff members. This has included site-specific bat working methodologies for 3 sites, known as Reasonable Avoidance Measures, and training on working around peregrine falcons (<i>Falco peregrinus</i>).</p>
--------------------------	---

Identify any opportunities that are available to your staff to take part in practical actions

<p>Text Field</p>	<p>As a wide-ranging organisation, opportunities to staff can vary depending on their role. For our Ranger Service and Monument Conservation Unit staff, for example, practical actions will form a large part of their day-to-day job.</p> <p>For office-based staff or those in non-practical directorates, the chance may be less frequent but there are still opportunities available. For example, in the summer of 2023, over twenty staff members attended an invasive non-native</p>
--------------------------	--



	<p>species removal day at Doune Castle. This educated staff on four of Scotland's most invasive plant species- Rhododendron (<i>Rhododendron ponticum</i>), Japanese knotweed (<i>Reynoutria japonica</i>), Giant hogweed (<i>Heracleum mantegazzianum</i>), and Himalayan balsam (<i>Impatiens glandulifera</i>)- informing staff on their identification and management options. After the identification session, staff removed Himalayan balsam from the grounds of the castle.</p>
--	---



SECTION 6: RESEARCH AND MONITORING

Describe any research activities that your organisation has undertaken to help develop understanding and awareness of biodiversity

<p>Text Field</p>	<p>Holyrood Park Holyrood Park continues to be a highlight of biodiversity research and monitoring at HES, with dedicated wildlife surveys and transects ran throughout the year by Ranger Service staff and volunteers.</p> <p><i>2022:</i> In 2022 61 Butterfly transects were walked across three different routes. These included 11 specifically for the Northern Brown Argus. These yielded 596 records of 20 different species. The records included three UKBAP Priority Species - Northern Brown Argus (<i>Aricia Artaxerxes</i>), Grayling (<i>Hipparchia Semele</i>) and the Wall (<i>Lasiommata megera</i>).</p> <p>Similarly, for bee monitoring 29 transects were walked across three routes, yielding 74 records of 6 species.</p> <p>45 species specific surveys were undertaken across the park for 7 EBAP species. These included surveys for:</p> <ul style="list-style-type: none"> • Skylark (<i>Aluada arvensis</i>) • Meadow Pipit (<i>Anthus pratensis</i>) • Bordered Brown Lacewing (<i>Megalomus hirtus</i>) • Maiden Pink (<i>Dianthus deltoide</i>) • Adder’s-tongue Fern (<i>Ophioglossum vulgariae</i>) • Sticky Catchfly (<i>Silene Viscaria</i>) • Wood-sage Plume Moth (<i>Capperia brytanniodactylus</i>) • Spring Sandwort (<i>Sabulina verna</i>). <p><i>2023:</i> In 2023 68 butterfly and 30 bee transects were walked across three different routes.</p> <p>63 species specific surveys undertaken for 8 different EBAP species. The list is as 2022, with the addition of:</p>
--------------------------	---



- Rock Whitebeam (*Aria rupicola*)

In total 221 staff hours were spent on scheduled wildlife surveys within Holyrood Park in 2023.

Changing Butterfly Assemblage in Holyrood Park

Since 2020 there have been several new butterfly species recorded in Holyrood Park. These are:

- Wall Brown (*Lasiommata megera*) (UKBAP Priority Species)
- Small Skipper (*Thymelicus sylvestris*)
- Green Hairstreak (*Callophrys rubi*)
- Large Skipper (*Ochlodes sylvanus*)
- Brimstone (*Gonepteryx rhamni*)

There is now 26 species of butterfly recorded in Holyrood Park out of a total of 34 species in Scotland.

Ground Nesting Bird Survey in Holyrood Park

A ground nesting bird survey is undertaken each year at Holyrood, focusing on the Salisbury Crags area of Holyrood Park. Historically a hillfort with managed grazing, the crags contain lowland calcareous grassland that is noted as a feature within

2021 – 2 pairs of skylarks and 3 pairs of Meadow Pipit

2022 – 2 pairs of skylarks and 3 pairs of Meadow Pipit

2023 – 2 pairs of skylarks and 3 pairs of Meadow Pipit

Linlithgow Peel and Loch

In Linlithgow in 2022 there were 13 transects walked (of a single route), which recorded 41 individuals of 9 species.

A Wetland Bird Survey is also completed each month at Linlithgow Loch by Ranger Service staff and volunteers. Since December 2020 this has recorded 26 species, including Great Crested Grebe and Little Grebe.



Environment Advisor (Ecologist)

As previously mentioned in [Section 3: Mainstreaming Biodiversity](#), an Environment Advisor was appointed in 2023, who advises on all ecological matters at HES. This has also increased out monitoring of sites, with 63 site visits undertaken since February 2023, assessing and recording habitats and offering verbal advice where necessary.

The Environment Advisor has also commissioned winter bird surveys at Blackness Castle in order to plan for a Responsible Transport Hub whilst considering the important surrounding biodiversity. As part of this, they are liaising with NatureScot to ensure that any future proposals will not negatively impact the SPA (Special Protection Area) and SSSI (Site of Special Scientific Interest) and will in fact improve the condition for the SSSI as part of the mitigation.

They have also had direct liaison with NatureScot for guidance on site management or proposals at 5 other designated sites: Inchmahome Priory, Inchcolm Abbey, Dumbarton Castle, Mousa Broch, Cadzow Castle and Holyrood Park. Furthermore, they assessed minor works by our Monument Conservation Unit and District Architects/Surveyors for more than 20 cases, predominantly involving bat potential in structures and trees, but also assessed impacts on lichen and bryophytes, beavers, badgers, common toads and moles. Work supported Schedule Monument Consent submissions to ensure that species and habitat mitigation protected biodiversity receptors. Notable examples include assessing a maternity bat roost in Hays House, Craignethan to allow essential re-roofing to be undertaken. For this HES staff worked with a consultant ecologist on a NatureScot Licence, to develop works implementation and the licensed mitigation.

Breeding Osprey Monitoring

Since 2022 there have been a pair of ospreys (*Pandion haliaetus*) nesting at one PiC. As a Schedule 1 listed species, this required careful consideration and appropriate response from operational staff. A NatureScot Licence was obtained to ensure that health and safety operations could be undertaken, but whilst they were nesting the site was closed to the public. Working with the Police Wildlife Liaison Officer, methods were deployed to try to limit informal access causing disturbance and reduce the likelihood of unlawful activities.

In both 2022 and 2023, it was confirmed that the osprey pair successfully bred, rearing one chick. With support from the regional Scottish Raptor Group, actions have been taken to encourage the osprey pair to select a more appropriate nesting location in the longer term where they will be less at risk from disturbance.

Satellite Monitoring Habitat Change

HES has been assessing the potential of heavily automated change detection using satellite imagery to monitor changes that may impact historic environment assets. We are part of a JNCC project (along with Natural England, Natural Resources Wales and NatureScot), enhancing the Sentinel-1 and -2 analysis-ready data ARD web service to detect and monitor landscape change. This is being piloted in eight areas across the UK. Part of this scoping work has looked at the



	<p>problem of concordance between vegetation indices and land classifications and historic environment concerns. This will be valuable in future considerations of the relationships between land cover and historic environment assets at a broad-brush scale and support integrated management approaches.</p>
--	--

What follow-up actions or monitoring have you undertaken to assess the impacts of the actions you have taken? How have you measured this? If you do not carry out any monitoring activities, please explain why.

<p>Text Field</p>	<p>Our Landscape Manager and Environment Advisor (Ecologist) liaise closely with site staff to assess the impacts of any land-management changes, such as those changes discussed in Section 2. This includes monitoring whether the establishment of wildflower areas has been achieved through changing mowing regimes, or the area could be more diverse through over-sowing of seed in subsequent years.</p> <p>Holyrood Park is also well-monitored by the Ranger Service and Monument Conservation Unit staff to inform decisions both before and after any change in land management. The mowing on the Salisbury Crag area, for example, has recently been expanded. This is after monitoring revealed that the calcareous grassland on the crags area was in a declining, unfavourable condition. This is partly due to the cessation of livestock grazing there in the 1970s, with the increased mowing designed to simulate grazing and prevent succession to scrubland. This change is required as the calcareous grassland is a feature of the SSSI designation of Holyrood Park.</p> <p>HES also collates data on an annual basis to inform our Sustainability Report, which is published as an annex to our Annual Report and Accounts and includes a section on Biodiversity.</p>
--------------------------	---

Does your monitoring show any significant trends or highlight any areas of concern?

<p>Text Field</p>	<p>Whilst monitoring across the estate is not widespread enough to identify specific trends, there are some observations that can be drawn from the in-depth monitoring that occurs at our largest site, Holyrood Park.</p> <p>Specifically, ground nesting birds continue to be a concern within Holyrood park. Breeding numbers have declined significantly over the preceding decades, and the Ground-Nesting Bird survey reveals there are only two pairs of skylarks and three pairs of meadow pipit remaining. This is despite the Holyrood Park Ranger Service’s hard work to attempt to reverse this trend by improving the grassland habitat available to them and encouraging visitors to keep dogs on leads.</p> <p>The assemblage of certain species groups also appears to be changing within Holyrood Park. For example, the addition of several new butterfly species to the park could be due to the changing climate causing changes to species’ ranges.</p>
--------------------------	---



	For example, it appears that the Wall butterfly's range is moving northwards as it is now seen each summer, when previously it was a scarce visitor.
--	--

Have you added any data collected to the National Biodiversity Network or your Local Records Centre?

Text Field	<p>HES staff and visitors are encouraged to use the iRecord website and mobile app for recording wildlife sightings. This is run by the Biological Records Centre (BRC) and allows records to be checked by experts, before being automatically shared with other users, National Recording Schemes, and Local Environmental Records Centres. Most records are also shared more widely via the NBN Atlas, contributing to nationwide biodiversity research.</p> <p>The following organisations receive HES recorded data via a direct extract from iRecord:</p> <ul style="list-style-type: none"> • Botanical Society of the British Isles • British Dragonfly Society, • British Mammal Society, • British Trust for Ornithology, • Bumblebee Conservation Trust, • Butterfly Monitoring Scheme, • East of Scotland Butterfly Conservation, • The (Lothian) Wildlife Information Centre, • Scottish Ornithologists Club, • Scottish Wildlife Trust, • UK Ladybird survey. <p>iRecord records were logged at several HES sites; these are predominantly Holyrood Park, Duddingston Loch and Linlithgow Peel, but also include Croy Hill, Blackness Castle, Seabegs Wood, and Tantallon Castle. There are currently 29 recorders involved in the HES Wildlife Recording scheme for iRecord. This includes staff members, volunteers and interested members of the public</p> <p>The following biological recording totals were accumulated across the HES estate via iRecord:</p>
-------------------	--



2021:

- 3685 records logged via the iRecord app/HES wildlife recording activity.
- 126 records logged directly to iRecord website.
- Total of 3811 wildlife records logged across HES estate.

2022:

- 2080 records logged via the iRecord app/HES wildlife recording activity.
- 64 records logged directly to iRecord website.
- Total of 2144 wildlife records logged across HES estate.

2023:

- 1633 records logged via the iRecord wildlife app/HES recording activity.
- 30 records inputted directly onto the website.
- Total of 1668 records (as of 29/11/2023) logged on iRecord.



SECTION 7: BIODIVERSITY HIGHLIGHTS AND CHALLENGES

Describe your organisation’s main achievements for biodiversity over the reporting period and what you are most proud of (this can include processes, plans, projects, partnerships, events and actions).

Text Field	<p>Our main achievements for the 2021-23 reporting period include:</p> <ul style="list-style-type: none"> • Adapting our grassland management of selected properties to greatly enhance biodiversity of these areas. This is covered in Section 2 of this report. This includes changing the mowing regimes at Aberdour Castle, Iona Abbey, Dryburgh Abbey and Tantallon Castle. This has benefited wildflower diversity, including species such as yellow rattle and common spotted orchid, and consequently benefited pollinators and other invertebrates. • Biodiversity has become more mainstream within our organisation. This is noted through the Heritage Directorate integrating biodiversity into the substantial frameworks noted in Section 3. We have also appointed key members of staff, such as the Environment Advisor (Ecologist) and Biodiversity and Climate Change Coordinator whose roles are dedicated to protecting and enhancing biodiversity. • Our engagement on biodiversity at our sites continues to grow, as noted in Section 4. This is particularly the case in Holyrood Park, where our Ranger Service engages the public and school groups on its biodiversity and history. However, we have also expanded our engagement at other sites, for example through our Wildlife Spotter guides at sites like Doune Castle and running wildlife focused tour at Stirling Castle during Climate Week.
------------	---

Looking ahead, what do you think will be the main challenges over the next three years?

Text Field	<p>Whilst there has been recent recruitment related to biodiversity and landscape, this is still an under-resourced area at HES. There are specific projects that require more investment, for example the development of Landscape Conservation Management Plans for our properties has been identified as needing an increased staff resource.</p>
------------	--



The problem of increased nutrient load and related algal blooms at Linlithgow Loch will continue to pose a challenge to water quality and biodiversity. The reformed Strategic Loch Management Group, steered by HES, aims to address these issues.

Our current Climate Action Plan 2020-2025 will end during the next reporting period. A significant challenge is completing the identified actions under the Biodiversity and Landscape theme, but the new biodiversity-related appointments are providing support with this. In the next three years we will also be developing our new Climate Action Plan and developing plans for biodiversity at HES as part of his.

Identifying and digitising Historic Environment Scotland's records relating to biodiversity and wildlife will likely continue to be a challenge. Although some progress has been made in recent years, there is currently no central resource allowing staff to consult site-specific ecological records, and many previous wildlife surveys have not yet been digitised.